

CLAIMS

I/We claim:

[c1] 1. An apparatus for handling an unmanned aircraft, comprising:
a support structure having a first portion and a second portion, at least one
of the first and second portions being movable relative to the other
between a first position and a second position;
a flexible recovery line carried by the second portion of the support
structure, wherein the recovery line is spaced apart from a point on
the first portion of the support structure by a first distance when the
at least one of the first and second portions is in the first position,
and wherein the recovery line is spaced apart from the point on the
first portion of the support structure by a second distance greater
than the first distance when the at least one of the first and second
portions is in the second position; and
an axially extendable resilient member coupled to the recovery line, the
resilient member being positioned to extend when tension is applied
to the recovery line.

[c2] 2. The apparatus of claim 1 wherein the support structure includes an
extendable boom, and wherein the first position is a retracted position and the
second position is an extended position.

[c3] 3. The apparatus of claim 1 wherein the support structure includes an
extendable boom, with the at least one of the first and second portions being
telescopically received in the other portion.

[c4] 4. The apparatus of claim 1 wherein the axially extendable resilient
member includes a spring.

[c5] 5. The apparatus of claim 1 wherein the flexible recovery line is configured to capture an unmanned aircraft in flight.

[c6] 6. The apparatus of claim 1, further comprising a rotatable base, wherein the support structure is pivotally attached to the rotatable base.

[c7] 7. The apparatus of claim 1 wherein the flexible recovery line is suspendable from the second portion of the support structure to hang at least generally downward.

[c8] 8. The apparatus of claim 1 wherein the flexible recovery line is suspendable from the second portion of the support structure, the flexible recovery line having a first recovery line portion hanging generally downward and a second recovery line portion attachable to a point on the support structure.

[c9] 9. The apparatus of claim 1, further comprising an unmanned aircraft having a lifting surface and a capture device mounted to the lifting surface, the capture device being configured to releasably secure the aircraft to the recovery line when the aircraft intercepts the recovery line.

[c10] 10. The apparatus of claim 1, further comprising a retrieval line operatively coupled to the recovery line, wherein the retrieval line is positioned to at least partially control motion of the recovery line.

[c11] 11. The apparatus of claim 1 wherein the support structure is configured to carry both a lateral load and a vertical load via the recovery line.

[c12] 12. An apparatus for handling an unmanned aircraft, comprising:
an extendable boom, the boom having a proximal end and a distal end
spaced apart from the proximal end, wherein the boom is extendable

along a longitudinal axis from a retracted position to an extended position;
a flexible recovery line suspendable from the boom when the boom is in the extended position, the recovery line being movable between a retracted position and a deployed position, wherein the recovery line in the deployed position extends at least generally downward; and
an axially extendable resilient member coupled to the recovery line, the resilient member being positioned to extend when tension is applied to the recovery line.

[c13] 13. The apparatus of claim 12 wherein the extendable boom includes a first segment and a second segment, with the at least one of the first and second segments being movable relative to the other as the extendable boom moves along the longitudinal axis between the retracted position and the extended position.

[c14] 14. The apparatus of claim 12 wherein the flexible recovery line is configured to capture an unmanned aircraft in flight.

[c15] 15. The apparatus of claim 12, further comprising a rotatable base, wherein the extendable boom is pivotally attached to the rotatable base.

[c16] 16. The apparatus of claim 12, further comprising an unmanned aircraft having a lifting surface and a capture device mounted to the lifting surface, the capture device being configured to releasably secure the aircraft to the recovery line when the aircraft intercepts the recovery line.

[c17] 17. The apparatus of claim 12, further comprising a retrieval line operatively coupled to the recovery line, wherein the retrieval line is positioned to at least partially control motion of the recovery line.

[c18] 18. The apparatus of claim 12 wherein the support structure is configured to carry both a lateral load and a vertical load via the recovery line.

[c19] 19. An apparatus for handling an unmanned aircraft, comprising:
support means having a first portion and a second portion, at least one of the first and second portions being movable relative to the other between a first position and a second position;
recovery means for intercepting and capturing an unmanned aircraft in flight, wherein the recovery means is carried by the support means;
and
tension means operatively coupled to the recovery means, wherein the tension means is configured extend when tension is applied to the recovery line.

[c20] 20. The apparatus of claim 19 wherein the support means includes an extendable boom, with the at least one of the first and second portions being movable relative to the other on a longitudinal axis extending along the boom between the first position and the second position, and wherein the first position is a retracted position and the second position is an extended position.

[c21] 21. The apparatus of claim 19 wherein the recovery means includes a flexible recovery line suspendable from the support means when the support means is in the second position.

[c22] 22. The apparatus of claim 19 wherein the tension means includes a spring operatively coupled to the recovery means.

[c23] 23. A method for handling an unmanned aircraft, comprising:
moving a first portion of a support structure relative to a second portion of the support structure to increase the length of the support structure;
deploying a flexible recovery line from the support structure;

flying an unmanned aircraft to intercept the flexible recovery line in flight;
and
releasably capturing the aircraft in flight with the recovery line.

[c24] 24. The method of claim 23 wherein the flexible recovery line is spaced apart from a point on the first portion of the support structure by a first distance when the at least one of the first and second portions of the support structure is in a first position, and wherein the recovery line is spaced apart from the point on the first portion of the support structure by a second distance greater than the first distance when the at least one of the first and second portions of the support structure is in a second position.

[c25] 25. The method of claim 23 wherein the aircraft includes a wing, and wherein capturing the aircraft includes releasably securing the wing to the recovery line.

[c26] 26. The method of claim 23, further comprising applying tension to the flexible recovery line after deploying the recovery line and before releasably capturing the aircraft.

[c27] 27. The method of claim 23, further comprising retrieving the aircraft from the recovery line after releasably capturing the aircraft.

[c28] 28. A method for handling an unmanned aircraft, comprising:
moving a first portion of an extendable boom relative to a second portion of the extendable boom to increase the length of the boom;
deploying a flexible recovery line from the second portion of the extendable boom, wherein the recovery line is suspended at least generally in a downward direction from the boom;
flying an unmanned aircraft to intercept the flexible recovery line in flight;
releasably capturing the aircraft in flight with the recovery line; and

retrieving the aircraft from the flexible recovery line.

[c29] 29. The method of claim 28 wherein the aircraft includes a wing, and wherein capturing the aircraft includes releasably securing the wing to the recovery line.

[c30] 30. The method of claim 28 wherein the at least one of the first and second portions of the extendable boom are placed in a retracted position before retrieving the aircraft from the flexible recovery line.

[c31] 31. The method of claim 28, further comprising applying tension to the flexible recovery line after deploying the recovery line and before capturing the aircraft.

[c32] 32. The method of claim 28 wherein the method further comprises controlling the flexible recovery line with a retrieval line.

[c33] 33. The method of claim 28, further comprising lengthening an extendable tension member coupled to the flexible recovery line when intercepting the aircraft with the flexible recovery line.